

## **REMARKS/ARGUMENTS**

These Remarks are responsive to the Office Action mailed September 8, 2005 ("Office Action"). Claims 1, 3-10, and 27 are pending in the application. No claims have been amended. Applicant respectfully requests reconsideration of the rejection of the pending claims for the following reasons.

### **35 U.S.C. § 112, first paragraph**

The Office Action rejects claims 1 and 3-10 under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor, at the time the application was filed, had possession of the claimed invention. Specifically, the Office Action alleges that the language "sufficient to render the surface of the alumina medium hydrophilic" does not appear to be supported by the disclosure originally filed, and hence constitutes new matter. In response, applicant respectfully points out that support may be found throughout the disclosure as originally filed. Specifically, at page 13, the specification states:

The UV irradiation in the presence of water vapour and oxygen produces ozone and hydroxyl radicals which clean the alumina surfaces rendering them hydrophilic. After UV irradiation a small droplet of distilled water was placed on the substrates to ensure the surfaces were hydrophilic, then blown dry under a gentle stream of nitrogen.

Furthermore, Example 3 states:

The powders treated with 1 x 10-5 and 5x10-4 floated whereas the 1x10-2 M NaOH treated sample sank indicating that the particles of alumina had become hydrophilic.

The foregoing examples fully support the claim language, and particularly the term "hydrophilic." Other examples in the specification that do not use the word hydrophilic also support the present claims because a person of ordinary skill in the art would understand that those examples provided a hydrophilic support. For example, in Example 3, under "H<sub>2</sub>O<sub>2</sub> treated Alumina," the observation that "the powders <1hr floated whereas times greater than 1 hr sank" would be understood by a person of ordinary skill in the art as providing a hydrophilic support.

Since the present claim language, particularly the word "hydrophilic," finds literal and implicit support throughout the specification, the use of this language in the claims does not constitute new matter. Accordingly, the rejection of claims 1 and 3-10 under 35 U.S.C. § 112, first paragraph, must be withdrawn.

#### **Obviousness -- 35 U.S.C. § 103**

The Office Action rejects claims 1, 3-10, and 27 under 35 U.S.C. § 103 as being obvious over U.S. Patent No. 5,512,491 ("Mehkeri").

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." Manual of Patent Examining Procedure § 2143.03 (8th ed., rev. 2, May 2004)

Mehkeri discloses ultra-trace level analysis of water using a coated CELITE support material. Specifically, Mehkeri states that CELITE is used as a support "upon whose surfaces have been deposited, preferably, a thin layer of freshly-prepared aluminum hydroxide." Mehkeri also discloses that "[s]uitable supports include zeolites, kieselghur, fuller's or diatomaceous earth, alumina and silica gel." Mehkeri, col. 3, ll. 9-12. Mehkeri only teaches modification of the support by coating it with a thin layer of freshly prepared metal ion hydroxide. Mehkeri, col. 7, ll. 19-32.

The Office Action recognizes certain differences between the claims and the teachings of Mehkeri, but concludes that it would have been obvious to modify Mehkeri to "dispense with the additional aluminum hydroxide coating suggested by the reference, and to contact the water undergoing treatment directly with the surface of the hydrated alumina, if one were willing to forgo the advantages associated with this additional coating." Office Action, page 3. However, the Office Action fails to address the claim limitations that require "contacting the water with the surface of a surface hydrated alumina ( $Al_2O_3$ ) medium, which contains a surface density of  $Al-OH$  groups sufficient to render the surface of the alumina medium hydrophilic." Applicant

respectfully submits that Mehkeri fails to render the claims obvious under 35 U.S.C. § 103, and that the Office Action fails to set forth a *prima facie* case of obviousness.

"To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." M.P.E.P. § 2143.03 (citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). Claim 1 is set forth below:

Method for the removal of microbiological contaminants from water comprising the steps of contacting the water with the surface of a surface hydrated alumina ( $Al_2O_3$ ) medium, which contains a surface density of Al-OH groups sufficient to render the surface of the alumina medium hydrophilic, for a time and under conditions such that a proportion of the microbiological contaminants present in the water are absorbed onto said hydrated alumina medium and removed from the water in a sufficient amount to make the water fit for human use or activity.

With respect to claim 1, Mehkeri fails to teach a surface hydrated alumina ( $Al_2O_3$ ) medium that contains a surface density of Al-OH groups sufficient to render the surface of the alumina medium hydrophilic. Even if one were to proceed contrary to Mehkeri's teaching and use uncoated alumina as the Office Action suggests that it would have been obvious to do, one would not meet all of the claim limitations. Specifically, placing alumina in water does not instantaneously produce a surface density of Al-OH groups sufficient to render the surface of the alumina medium hydrophilic as required by the claims. It should be noted that soaking for one hour in  $5 \times 10^{-4}$  M NaOH did not result in making the surface of the alumina powders hydrophilic. See Example 3 of the Specification. Thus, Mehkeri does not teach or suggest all of the claim limitations, and, consequently, cannot be used without a secondary teaching to render the claims obvious.

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." M.P.E.P. § 2143.01; see also *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002). "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure." M.P.E.P. § 2143 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

As discussed above, the claims require “contacting the water with the surface of a surface hydrated alumina ( $\text{Al}_2\text{O}_3$ ) medium, which contains a surface density of Al-OH groups sufficient to render the surface of the alumina medium hydrophilic.” Although the Office Action alleges that a person having ordinary skill in the art would find it obvious to use uncoated alumina particles to purify water, such modification does not meet all of the claim limitations as discussed above. The claims instead require contacting water having microbial contaminants with alumina that is hydrophilic. The Office Action fails to point to anything in Mehkeri that would teach or suggest contacting water having microbial contaminants with alumina that has a hydrophilic surface. As the Office Action fails to identify a teaching, suggestion, or motivation to modify the teaching of Mehkeri to produce the claimed invention, the Office Action fails to set forth a *prima facie* case of obviousness. Accordingly, the rejection of claims 1, 3-10, and 27 under 35 U.S.C. § 103 as being obvious over Mehkeri is improper and must be withdrawn.

Nothing in Mehkeri teaches or suggests “contacting the water with the surface of a surface hydrated alumina ( $\text{Al}_2\text{O}_3$ ) medium, which contains a surface density of Al-OH groups sufficient to render the surface of the alumina medium hydrophilic.” In fact, to increase the surface density of Al-OH groups, Mehkeri teaches coating the support with a freshly prepared aluminum hydroxide. Mehkeri, col. 3, ll. 8-10. The Office Action fails to consider this aspect of Mehkeri which would lead a person of ordinary skill in the art away from using an alumina medium that is hydrophilic. Accordingly, the rejection of claims 1, 3-10, and 27 under 35 U.S.C. § 103 as being obvious over Mehkeri is improper and must be withdrawn.

Claims 3-5, 9, and 10 depend from and incorporate the limitations of claim 1, which is discussed in relation to Mehkeri above. “To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.” M.P.E.P. § 2143.03 (citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). As discussed above, Mehkeri fails to teach or suggest all of the limitations of claim 1. Therefore, claims 3-5, 9, and 10, which incorporate the limitations of claim 1, are not obvious in view of Mehkeri since Mehkeri does not teach or suggest all of the limitations of these claims.

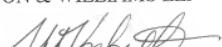
Claims 3-5 and 27 require a surface hydrated alumina medium comprising “a surface density of Al-OH groups . . . at an average rate of greater than about 1 hydroxyl group per 10  $\text{nm}^2$  of surface area.” The Office Action acknowledges that the support of Mehkeri contains Al-

OH in "some unspecified surface density." Office Action, page 3. The Office Action then concludes that "it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ alumina having the recited surface density of Al-OH groups in the reference process, in order to ensure that enough active hydroxyl groups are present to adequately purify the water." Office Action, page 3. However, the Office Action completely overlooks Mehkeri's teaching of coating the support with a thin layer of freshly prepared metal oxide to provide more hydroxyl groups. Instead of increasing the amount of hydroxyl groups on the surface of the substrate as would be required to meet the claim limitations, Mehkeri coats the substrate with a thin layer of metal ion hydroxide to provide additional hydroxyl groups. The Office Action fails to point out how Mehkeri teaches or suggests increasing the surface density of Al-OH to at least 1 hydroxyl group per 10 nm<sup>2</sup> of surface area. Thus, Mehkeri does not suggest the claim limitation of a surface hydrated alumina medium comprising "a surface density of Al-OH groups . . . at an average rate of greater than about 1 hydroxyl group per 10 nm<sup>2</sup> of surface area." Accordingly, the rejection of claims 3-5 and 27 under 35 U.S.C. § 103 as being obvious in view of Mehkeri must be withdrawn.

Applicant submits that this response addresses all of the issues raised in the Office Action and places the pending claims in condition for allowance. Should any issues remain to be discussed in this application, the undersigned may be reached by telephone. In the event any variance exists between the amount authorized to be charged to the Deposit Account and the Patent Office charges for reconsideration of this application, please charge or credit any difference to the undersigned's Deposit Account No. 50-0206.

Respectfully submitted,  
HUNTON & WILLIAMS LLP

By:



Jeff B. Vockrodt  
Registration No. 54,833

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Hunton & Williams LLP  
Intellectual Property Department  
1900 K Street, N.W.  
Suite 1200  
Washington, DC 20006-1109  
(202) 955-1500 (telephone)  
(202) 778-2201 (facsimile)